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West Europe Report

SCIENCE AND TECHNOLOGY

No. 70

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WEST EUROPE REPORT

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CONTENTS

TRANSPORTATION

BRIEFS

ORE-EXTRACTING MICROORGANISMS STUDIED--The West German Research Ministry will invest 3.2 million DM in research to study microorganisms for extracting metals from low-grade ore and mine tailings. The method is used in the United States, Canada, the Soviet Union, and elsewhere. The 3.2 million DM corresponds to about 7 million kronor. [Text] [Stockholm NY TEKNIK in Swedish 11 Jun 81 p 24] 9336

CSO: 3102/354

ENERGY

FIRST FRENCH SOLAR POWER PLANT TO OPERATE AT END OF 1981

Paris AFP SCIENCES in French 4 Jun 81 pp 22-24

[Text] CNESOL-THERMIS, the first French 2.5 MW solar power plant, is to start operating at the end of 1981, according to a document published by EDP [French National Electric Company] on the status of construction work at the Targasonne plant (Pyrenees-Orientales).

Tower solar plants have been under study in France by the CNRS [National Center for Scientific Research] and EDF since 1976. The work has been designated under the code name THEM program (Megawatt Thermo Helio Electric plants). The two organizations made the decision to build the first solar plant in September 1977, but the project was re-directed in the spring of 1979 for budget reasons.

On 20 June 1979, the Council of Ministers decided to set up a thermodynamic solar energy conversion program and restarted the THEM program. A decision was made to implement, along with the Solar Energy Commission which had then just been created, a National Center of Solar Tests (CNESOL), using the THEMIS plant, with a melted salts oven, to study high-temperature cycles. An agreement was signed between COMES [Solar Energy Commission] and EDF in October 1979, designating EDF as the prime contractor for the construction work and for the management of the center until March 1982.

Located a few kilometers from Odeillo and Font-Romeu, the Targasonne site of the CNESOL (at 1,700 m altitude), is one of the sunniest in France (2,400 hours/year).

The Solar Energy Commission, the CNRS, and the research and development branch of EDF all participate in the studies and in the work in progress at the plant under the direction of the Equipment Division of EDF of the Alpes-Marseilles Equipment Region (REAM).

Since the objective of CNESOL is to carry out tests, the site will be equipped with five weather stations, a cloud-detection device, a flux measurement device at the mouth of the oven, an infrared camera inside the oven, etc. It will then be possible to verify the theoretical base which led to the implementation of the plant. Components and technological alternatives will then be tested (THEMIS will be used as a test-bench for the automatic control system which is currently being considered for nuclear power plants). Performance improvements and cost reductions will then be attempted. Finally, there will be a determination of the optimal procedure to run the plant in order to obtain the best possible efficiency.

The CNESOL program is to take place in two steps:

--The first step, which is currently underway, will result in the creation of a double heliostat field, a tower, research facilities, and plant installation. The latter is located near the tower and the air-condenser and includes an area for auxilliary equipment, salt storage and handling, back-up diesel engine, secondary heat storage, melted salt storage, machinery room, electrical equipment room, workshop, and storeroom. Start-up is planned for the end of the year.

--In a second step, which is not in the plans today, it will be possible to implement additional loops without interrupting the plant operation by building a second tower and enlarging the plant facility.

Financing and Costs

Financing is being shared at 13 percent by the Pyrenees-Orientales district and the Languedoc-Roussillon region, 39 percent by the Solar Energy Commission, and 48 percent by EDF. On the September 1979 economic basis, the cost was evaluated at 128 million francs not including taxes. This cost included:

20 percent for civil engineering

53 percent for the mechanical area (half of it for the heliostats)

15 percent for the electrical area.

These expenses cover not only construction of the plant itself, but also everything required by the research center, and the difficulty of adapting to the terrain.

Costs

--Total Construction Costs, based on September 1979 costs.....128 million francs

--Basis for the calculation:

--Completion.....9 percent/year

--Rated power.....2,500 KW

--Production at 90 percent availability.....3 GWh per year (billion KWh)

--Average cost of installed KW

--Construction.....35,000 francs

--All costs included.....36,000 francs

--Cost of produced KWh

--Construction.....2.60 francs

--All included.....2.80 francs

Including operation costs.....5 to 5.40 francs

Features of the THEMIS Solar Power Plant -- 2.5 MW:

Basic life span	20 years
Maximum period of sunshine	1,040 W/m^2
Maximum solar thermal power received	11,170 KWth
Overall gross conversion yield	0.22
Maximum electrical power produced	2,500 KW
Power used by auxiliary equipment	200 KW
Nominal power	2,500 KW
Average annual sunshine	2,400 hours
Solar energy received yearly	18.26 GWhth
Average annual energy yield	0.16
Electrical energy produced yearly	3 GWhe

6445
CSO: 3102/362

GOVERNMENT SUBSIDIZES SOLAR COLLECTORS FOR PRIVATE HOMES

Stockholm NY TEKNIK in Swedish 11 Jun 81 p 11

[Article by Mikael Holmstrom]

[Text] An Italian home owner who wishes to install solar collectors can have the total cost paid by the state and the Italian power authority. The purpose is to reduce electricity consumption--heating tap water by electricity is considered wasteful. Within 6 months, 100 thousand solar collectors will be installed.

Subsidies are now being distributed for solar collectors in southern Italy. The idea is that anyone wishing to heat his tap water using solar heat can go to the local office of the power company. The Italian power authority, Enel, will then give the home owner a list of recommended solar collectors.

Practical Tests

This list is the result of practical tests at a plant in Sicily where the solar collectors were tested. As in Sweden, experience from the first generation of solar collectors was disappointing. However Enel, which has now tested around 80 brands, now believes it will soon be able to present a list of about 25 different solar collectors that fullfil their requirements.

Lower Electricity Bill

Thirty percent of the purchase and installation costs will be paid by the state in the form of deductions and tax cuts. The remaining 70 percent will be returned to the home owner through lower electricity bills.

The background to this generous attitude toward solar collectors is that 72 percent of the Italian electricity production is based on oil. It is estimated that 9 percent of the country's total electricity production goes toward heating tap water.

"Heating tap water is a waste of electricity. It should not be used for showers and cleaning," said Roberto Vigotti of Enel's research and development division.

100,000 Solar Collectors

Enel stated that the goal of the campaign that is now beginning is to install 100 thousand solar collectors in 6 months.

Even though state-owned Enel is not involved in other types of energy than electricity, it is now prepared to enter the heating field. This is being done so that through technical and economic help consumers will use less electricity.

For home heating and for heating tap water in the winter, it is assumed that electric power will be needed in the foreseeable future.

Solar Power Plant

Enel is also responsible for operating the world's first solar power plant for the large-scale production of electricity, recently started in Sicily.

Enel also has certain experiments underway in the field of solar collectors. For remote households it would be economically justifiable even today to install solar collectors instead of constructing power lines. In Italy there are about 1,500 households in this category, but there are no plans in Italy to construct solar collectors on this scale.

9336
CSO: 3102/354

BRIEFS

COAL GASIFICATION PLANT STUDIES--Methanor Company, a subsidiary of the Dutch companies Azko and DSM, and of Norwegian and Swedish partners, is studying the feasibility of a coal gasification plant. The gas produced in this manner could be used to feed a methanol plant with a capacity of 500,000 tons per year. The process used would be the Lurgi process. The gasification plant is to be constructed in Eemshaven, in the north of the Netherlands, and will have a capability of 1 Gcuft/year. [Text] [Paris SEMAINE DE L'ENERGIE in French 25 May 81 p 10] 6445

CSO: 3102/362

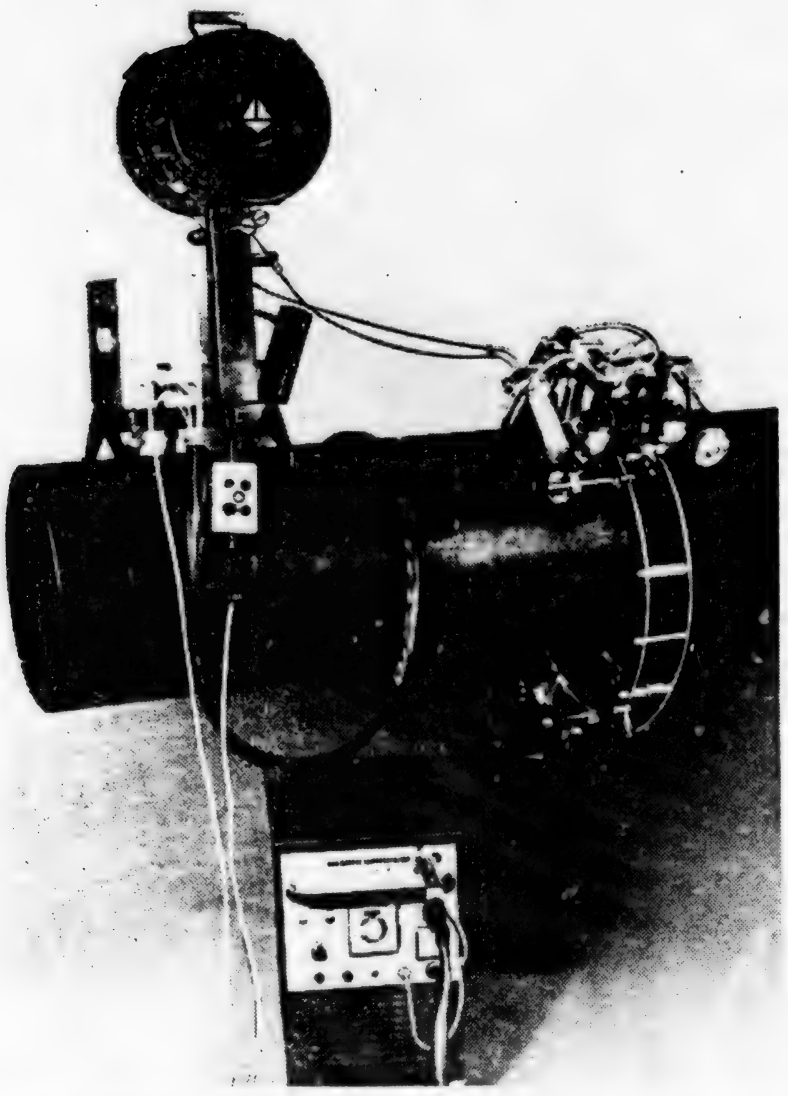
HALOGEN BEAM METHOD USED TO WELD PLASTICS

Duesseldorf VDI NACHRICHTEN in German 29 May 81 p 9

[Text] A process for welding thermoplastic materials such as polyethylene (PE) and polypropylene with halogen light and warm gas has been developed by Messer Greisheim, Frankfurt. The welding material in filament form is fed from a filament supply unit by an electric motor into an electrically-heated and thermostatically-controlled chamber, where it is completely plasticized and converted into a highly viscous strand. At the end of the melting chamber, this strand is extruded through a welding shoe whose shape can be selected for the job at hand and is then pressed into the seam to be welded.

Several supply units are provided for the Varioplast System from which a suitable unit can be selected depending on the application, manual or machine, and on the size of the welding job.

Concerning supply units, a filament feeder and a filament supply are integrated in the unit for manual welding of up to 1 kg/h of polyethylene. All units have an attachment for externally-supplied air for cooling the halogen radiator and for prewarming the material to be welded. In addition, the building-block system also includes equipment for construction-site operation which provides a cooling unit for the halogen radiator and a warm-gas generating unit.



Functional units such as the system depicted here for mechanical orbit welding of plastic pipes can be assembled from Varioplast building blocks from Messer Greisheim

The welding head and halogen radiator for manual welding has a weight of 3 kg. The interior corners of containers can also be welded with special corner jets. Contamination of the welding filament is precluded by the protected-filament feed device. The heating block in the welding head can be changed to permit welding of a variety of materials.

For mechanical circumferential seam welding (orbital welding) of pipes and for longitudinal seam welding, welding-head guides are available for pipe diameters ranging from 90 mm to 1,200 mm and for path lengths from 2,200 to 3,200 mm.

This plastic welding system is suitable for plastic-working shops in the chemical industry and the trades and for the manufacturers of plastic tube and semifinished materials. Opportunities for application present themselves wherever plastic pipes and foils have to be laid, such as in the construction of channels, dams and dikes in the distributed-heat and solar industries.

9160
CSO: 3102/349

IRON PROCESS USES PEAT INSTEAD OF COKE, SAVES ENERGY

Stockholm NY TEKNIK in Swedish 4 Jun 81 p 4

[Article by Birgit Andersson]

[Text] "Replace old blast furnaces with more energy-efficient methods." This was stated by doctoral candidate Massoud Pirjamali of KTH [Royal Technical University] in Stockholm.

He uses peat as a reducing agent instead of coke. Both gasification and reduction occur in the same reactor.

"We can take away both the coking plant and the sinter plant and by using peat we can utilize our domestic fuel," Massoud Pirjamali explained at the Institute of Chemical Technology. Pirjamali's method is a direct reduction process that yields iron sponge. In this type of process the ore is reduced in solid form. Natural gas or gas from coal can be used. Pirjamali's method is an alternative direct reduction process in which peat is utilized as the reducing agent. The iron is not smelted because the temperature in the reducing reactor is lower than in traditional blast furnace processes.

"Our KTH group has tested charcoal in the laboratory and in a second phase we will now test peat. Our results indicate that we will obtain good reduction," Pirjamali said.

Lower Temperature

The normal blast furnace process at the iron works is used to produce pig iron from enriched iron ore. The process requires a coking plant--the coke is used to reduce the iron ore to iron and keep the temperature sufficiently high. A sinter plant is also required, where the finely ground iron ore, so-called concentrate, is made into small balls.

The temperature in the furnace is so high, around 1,500°C, that the iron ore melts.

All this requires large investments and much energy. The coking and sinter plants together account for almost half the total investments in the blast furnace process.

The sinter plant is responsible for at least 10 percent of the energy costs.

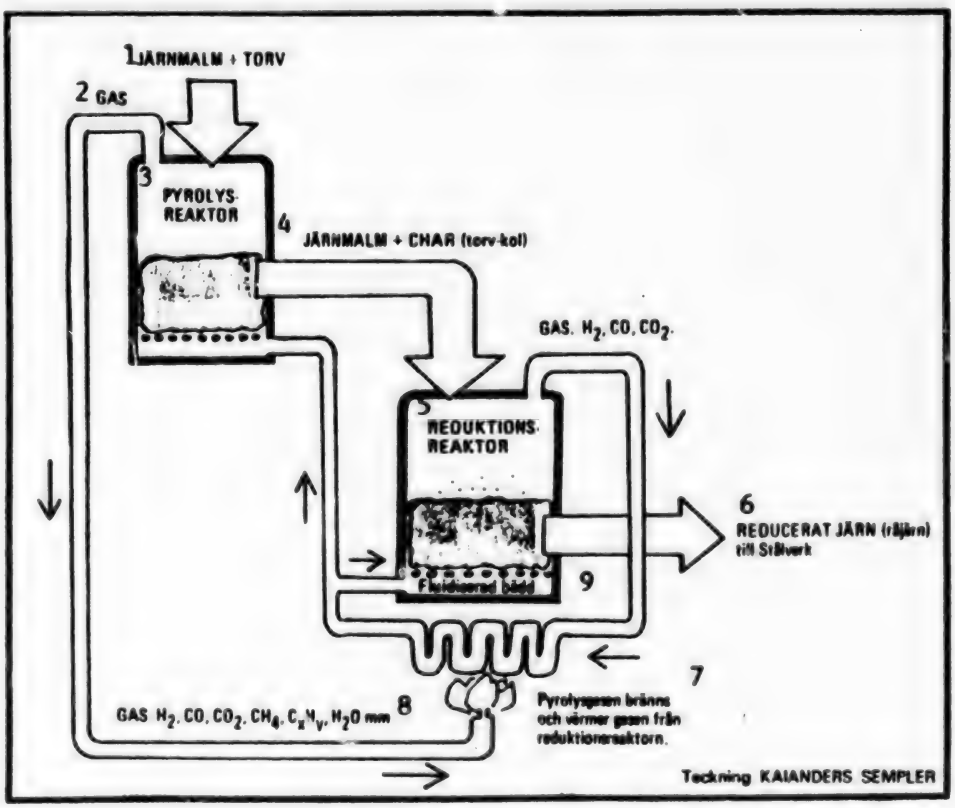
"In our process the iron ore is not melted because the reactor temperature is between 800 and 1,000 degrees.

The KTH method is called iron ore reduction in a fluidized bed and it is accomplished in two stages--first pyrolysis and then reduction.

In both reactors--the pyrolysis reactor can be simply a tube--the solid material floats on gas fed from below.

Ore and peat are fed into a pyrolysis reactor where the iron ore and peat are heated. The pyrolysis process is very rapid. It takes 2 to 3 seconds at 800°C. The peat is then carbonized and forms so-called peat char. Gases are formed at the same time--hydrogen, carbon monoxide, and carbon dioxide. The ore in the reactor, along with the charred peat, proceed to a reduction reactor. The gas from the pyrolysis reactor is burned and heats both reactors.

The char is gasified to carbon monoxide and carbon dioxide in the reduction reactor. The carbon monoxide reduces the ore to iron. The remaining gas recirculates in part to the reduction reactor and in part to the pyrolysis reactor. The product is pig iron which is sent on to a steel mill.



Key:

1. Ore + peat
2. Gas
3. Pyrolysis reactor
4. Iron ore + char (peat coal)
5. Reduction reactor
6. Reduced iron (pig iron) to steel mill
7. Pyrolysis gas is burned and heats gas from reduction reactor
8. etc.
9. Fluidized bed

First pyrolysis, then reduction is performed. Ore and peat are fed into the pyrolysis reactor and heated by gas formed in the process. Peat char, the carbonized peat, is fed into a reduction reactor and there it is reduced to pig iron. Carbon monoxide and carbon dioxide that remain are recirculated, partly to the reduction reactor and partly to the pyrolysis reactor.

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CSO: 3102/352

BRITISH GOVERNMENT FINANCES ROBOTICS DEVELOPMENT

Duesseldorf VDI NACHRICHTEN in German 5 Jun 81 p 40

[Text] The British Government is subsidizing studies relating to possible robot applications up to 50 percent of the associated cost; an initial industrial application or the development of an industrial robot is subsidized up to 25 percent of cost. As British Prime Minister Margaret Thatcher expressed in Brighton in May at the opening of the joint meeting of the European Automated Manufacturing Exhibition and Conference, the International Automation Conference and the British Robot Association (annual meeting), a general increase in productivity and favorable effects on other areas of the British economy are expected from this generous program.

Under these favorable conditions, for example, British Sykes Ltd. is now cooperating with the Japanese company Dainichi Kiko and Hadan Drysys Ltd. with Hitachi. The world's largest industrial robot manufacturer, the American company Unimation, Inc., has already expanded one of its factories in Great Britain because of this generous support. Up to 60 percent of the parts contained in the 20 Puma industrial robots currently produced each month in the Telford factory are manufactured in Great Britain.

That further development of conventional assembly automats should not be neglected while focusing on new industrial robots and sensors is clearly shown by successful Japanese automation measures. A flexible assembly automat from Nippondenso works on 288 variants of indicator instruments for automobile dash-boards. The work-cycle time amounts to 1 s; also, the conversion time from one variant to any other variant takes only 1 s. The assembly machine is converted about 200 times daily while working on average lot sizes of 40 pieces.

What is also clear here is that the success of Japanese industry is not due just to the handling methods used but is also due to consistently designing products which can be produced by automation.

9160
CSO: 3102/349

SCIENCE POLICY

GOVERNMENT'S PORTION OF INDUSTRIAL RESEARCH TO DOUBLE

Paris LE MONDE in French 22 Jul 81 p 11

[Article by X.W.: "Because of Nationalizations: Industrial Research's Share in the Public Sector Will Double"]

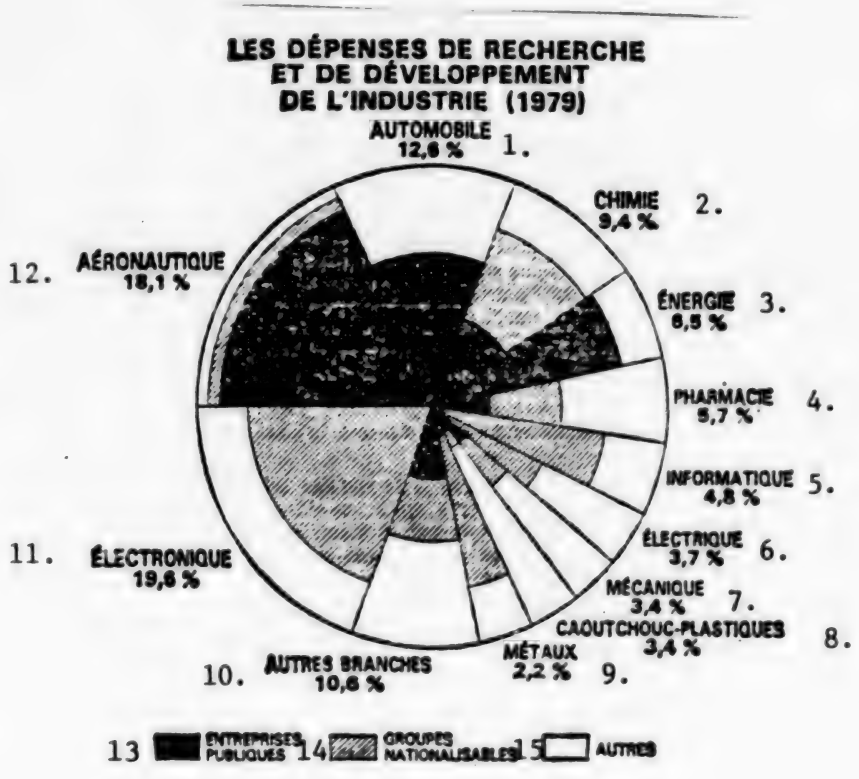
> [Text] In France as in many other countries, industrial research is completely focused on a certain number of strategic sectors or on advanced technology. The electronics, aeronautics and automobile industries alone accounted for over one half of expenses for industrial research in 1979, which totaled 26.3 billion francs.
>
> Some of the nationalizations which the government has proposed will affect these strategic sectors. This will, therefore, considerably increase the size of the public and nationalized sector in industrial research. Being in what have been deemed priority sectors, today's "nationalizable" firms (as shown by the well-known "Hannoun Report" on state aid to industry in 1979) are already the prime beneficiaries of public research subsidies.

One effect of the nationalizations will be to practically double the size of industrial research under public control. According to the statistics of the General Delegation for Scientific and Technical Research (D.G.R.S.T.), the current public sector[1] accounts for a little over one quarter (6.87 billion francs in 1979, or 26 percent) of industrial research; nationalizable firms[2] a little bit more: 7.18 billion, or 27 percent. In 1979, the group "public firms-nationalizable companies" received 82.8 billion francs in subsidies, 3.04 billion (52.5 percent) went to the public sector; 1.76 billion (30.3 percent) went to the private sector which is now nationalizable.

In all, the "new" public industrial sector represents about one third of the national research potential. Taking into account the importance of the public research sector, which is mainly in fields other than industrial research (universities, large institutes), the public sector will control, by the end of the nationalization process, 70 to 75 percent of the total research and development effort in the country.

As the illustration on the following page shows, the state will have under its control 93 percent of research and development in aeronautics (compared to 79

percent today); 60 percent in electronics (0 percent today); 55 percent in data processing (0 percent today); 62 percent in chemistry (15 percent today); and 29 percent in pharmacy (5 percent today).



Expenditures for Industrial Research and Development (1979)

1. Automobiles
2. Chemistry
3. Energy
4. Pharmacy
5. Data processing
6. Electrical
7. Engineering
8. Rubber/Plastic
9. Metals
10. Other
11. Electronics
12. Aeronautics
13. Public Firms
14. Nationalizable companies
15. Other

These figures, which illustrate the impact of nationalization on industrial and technological research, should not, however, be misinterpreted: the state, through the size of its subsidies, already had a certain amount of control on the research of these companies which are today private and will be public tomorrow. (This is obviously the case for defense related research, for example, in the electronics field.) At the same time, firms already in the public sector have almost always kept, until now, a great deal of autonomy in defining their research and development programs.

These data raise a few questions. The state will soon control three quarters of the country's research potential, and over one half of industrial research potential. Will it be necessary to restructure or at least to federate the efforts undertaken by firms dealing at an open international level--and sometimes national level--with the efforts of the major public research institutes such as the Atomic Energy Commissariat or C.N.R.S. [National Center for Scientific Research]? And if so, how?

FOOTNOTES

1. French Electric Company (EDF), French Gas Company (GDF), French National Coal Company, Elf-Aquitaine, SNIA [National Industrial Aerospace Company], SNECMA [National Aircraft Engine Study and Manufacturing Company], European Propellant Company (SEP), French Company for Aerial Navigation Equipment (SFENA), Renault, National Powder and Explosives Company (S.N.P.E.), Mineral and Chemical Enterprises, S.N.C.F. [French National Railroad Company], R.A.T.P. [Independent Parisian Transport System], Air France, SEITA [Commercial Tobacco and Match Manufacturing Agency].

2. The estimates include the companies--and not just the holdings--and their subsidiaries which are over 50 percent controlled. The list, which contains three companies with heavy foreign participation, is: Thomson, P.U.K. [Pechiney-Ugine-Kuhlmann], C.G.E. [General Electricity Company], Rhone-Poulenc, Saint Gobain-Pont-a-Mousson, C.I.I.-Honeywell-Bull, Dassault, Matra, Roussel-Uclaf, Usinor, Sacilor, I.T.T.-France. For Matra we have included all of the company's research. For I.T.T.-France, only C.G.C.T. [General Telephone Construction Company] was considered.

9720
CSO: 3102/358

SWEDISH ENGINEERS WORK ON METHANOL-HYDROGEN ENGINE

Stockholm NY TEKNIK in Swedish 4 Jun 81 p 19

[Article by Ulf Bergmark]

[Text] Fuel consumption by automobiles can be cut in half. This is the contention of Krister Sjostrom, researcher at the Technical University in Stockholm. He is leading a project on energy-efficient engines driven by methanol and hydrogen. This research is now facing a breakthrough, both in Sweden and the United States.

In the United States, where this research has proceeded further, an automobile engine has already been constructed that proves Krister Sjostrom is correct: energy consumption can be drastically reduced in an automobile engine.

This requires that the engine be run on methanol instead of gasoline.

At the university's Institute for Chemical Technology the methanol engine has been run since 1977. The present engine is a Volvo B 20 equipped with a nickel catalyst that converts part of the methanol to hydrogen and carbon monoxide ($CH_3 \rightarrow CO + 2H_2$).

Water and Carbon Dioxide

Under partial load the engine operates on gas alone. Hydrogen is an ideal fuel that forms no exhaust gases that are harmful to the environment when burned, only water and carbon dioxide.

Since the hydrogen can be produced in the car, no heavy, bulky pressurized containers or metal hydride tanks are needed. The energy storage capacity of methanol is 20 MJ/kg. The corresponding figure for magnesium hydride is a maximum of 6.8 MJ/kg. In a pressurized vessel the storage capacity is even lower.

The remarkable thing is that the gas (hydrogen + carbon monoxide) has a 10 to 20 percent higher energy content than the methanol. The explanation is that part of the heat energy in the exhaust gases that run the catalyst are converted to chemical energy.

Krister Sjostrom and his colleagues Soren Eriksson and Gunnar Landqvist have produced a proposal for an optimum engine. The present engine must be improved in three respects.

Higher compression. In a methanol-hydrogen engine the compression ratio can increase to 14:1. This increases efficiency by 10 to 15 percent over a normal gasoline engine.

Greater air excess. Hydrogen is an economic fuel because it requires very small quantities of gas to make the fuel-air mixture burn.

While gasoline does not ignite in an engine with just a 10 percent air excess, hydrogen can burn with an air excess of 500 percent in fuel-air mixture. The optimum air excess is 300 to 400 percent.

Doubled Efficiency

Thus, a hydrogen engine can be driven with wide-open throttle even at low loads. This means doubled efficiency under partial loads, i.e. during normal driving. An open throttle creates a high vacuum in the intake manifold. This vacuum, which can be half of atmospheric pressure, "brakes" the piston as it drops during the intake stroke.

The disadvantage with the lean fuel-air mixture is that the peak performance is low. When the gas pedal is depressed, therefore, methanol is injected along with the hydrogen. When the engine is under full load the motor runs on methanol alone.

The catalyst may be changed. For the nickel catalyst to function, part of the gases must recirculate. Otherwise, carbon may be deposited as a layer of soot. This decreases the excess energy in the gas to 10 percent over the methanol. With a copper-zinc or a noble metal catalyst the energy surplus is 20 percent.

The research grant from the Board for Technical Development will run out in October. If more money is forthcoming, a first Swedish car with a methanol-hydrogen engine will be produced in about 3 years. So far, many questions remain unsolved, for example how the control system will be made and what type of catalyst will be used.

No More Expensive

It is still too early to say how much such an engine will cost in series production. It will hardly be more expensive than a diesel engine, however, but much more energy-efficient.

According to our estimates this engine could be so energy-efficient that it would pay even to convert gasoline to methanol, Krister Sjostrom said.

In the United States, a Chevrolet Citation is being run with a methanol-hydrogen engine. It uses a copper-zinc catalyst. The compression ratio has been increased to 14:1. A propane carburetor used in ordinary gas-driven cars feeds in the gas and an injection system feeds the methanol.

The car was built by the Energy Department's solar research laboratory, Seri in Ohio in cooperation with the Jet Propulsion Laboratory in California.

A preliminary report on the American experiment will soon be published. The research leader at Seri, Joe Finegold, has stated that this engine can be twice as efficient as a gasoline engine.

Research on methanol as a hydrogen carrier is also being conducted at several American universities. Soviet researchers are also reported to be experimenting with methanol-hydrogen engines. The Soviet Union has a relatively extensive research program on hydrogen-driven cars.

93336
CSO: 3102/352

EUROPE'S CAR PRODUCERS' FIGHT FOR SURVIVAL

Hamburg DER SPIEGEL in German 8 Jun 81 pp 36-48

/Unattributed article: "The Fight for Survival — European Auto Manufacturers Investing Billions"/

> /Text/ The major auto manufacturers in Europe and the United States are planning to invest billions to save their industry from its most serious crisis to date. Nevertheless, pressure from Japanese competitors and future surplus capacities could very soon mean the end for many a European make of automobile.

The construction workers first carted away 700,000 square meters of marshy North German soil and then poured in a million cubic meters of dry sand. Thousands of iron rods have already been anchored in the ground, and tons of cement are now disappearing into the excavations every hour.

Even from a distance, a forest of giant construction cranes next to Sebaldsbrueck's Heerstrasse in the northern part of Bremen announces the presence of the largest construction site in the Federal Republic. And there, where to the right of Heerstrasse sit the small suburban homes numbered from 236 to 307a, a huge sign rises high out of the ground on the left.

It shows a neat model of the new factory, with much greenery and few smokestacks. The builder-owner is advertised in small letters: Daimler-Benz AG /Co, Inc/.

In Bremen's Sebaldsbrueck district the Stuttgarters are now investing the enormous sum of far more than DM 1 billion to construct new assembly buildings. Up to 120,000 cars are to roll off the assembly line here every year beginning in 1983.

Just like Mercedes in Bremen, and just as though the golden age of the automobile still lay ahead, Volkswagen and BMW, Ford and Opel, France's Renault and the European branches of General Motors are also investing billions in new factories and new machinery, in designs for new bodies and new engines. Says VW chief Toni Schmuecker: "We have to invest, invest, invest."

The auto executives have been topping one another in recent months with their announcements of new programs costing billions. Mercedes plans to invest DM 10 billion in 5 years; Volkswagen is doing 13 billion in 3 years; Fiat has announced 11.5 billion, Ford 10 billion and BMW the sum of 4 billion.

What for? For even more cars on roads that are already overcrowded? For an even higher oil bill? For even more din and stench in the cities?

Not for any of this, say the auto executives, while promising the opposite: the car that can do everything better.

Nonetheless, all the billions in investments and all the promises do not change the fact that the shine has worn off the chrome, paint and horsepower, that the industry is approaching the limits of its growth.

The star industry from the years of the economic miracle has yet to digest the oil price shock of 1979-80 — and it will not be the last one. It must deal with a still growing distaste for a consumer culture whose undisputed symbol for more than three decades has been the automobile.

The markets are nearly saturated — at least those in Western Europe and North America — and wherever there is anything left overseas, the Asians are cleaning up: Toyota, Nissan, Honda and company — the ones who have risen from nearly total obscurity to become the world's number one automobile power.

Initial shock waves reached the industry long ago: In England, British Leyland is being kept alive only with difficulty, with billions from the tax coffers; in the United States, the country's largest automobile company, Chrysler, would be finished without money from Washington; in Italy, Alfa Romeo has been supported by the state for years.

France's giant of the auto industry, the PSA group consisting of Peugeot, Citroen and Talbot, is reporting mass layoffs, plant closings and a flood of red figures. Italy's Fiat is fighting for survival at the same time: A series of unending strikes and a worn model strategy have been pushing the once strong automobile company to the brink.

In the United States, "by far the worst year the industry has ever had" (according to Road and Track, the car magazine) affected all the producers: General Motors, Ford, American Motors and Chrysler together came up with the astronomical sum of a good DM 9 billion in losses for 1980 alone.

In the FRG as well, where car companies experienced a boom from 1975 to 1979, the auto festival has been winding down rapidly. Since that time there have been mass layoffs once again — 6,000 workers at Ford and 6,000 at Opel — short hours, red figures and signs of crisis — even at Volkswagen.

There is no longer any hint that the good old days for the automobile will ever return. Only a few optimists expect more cars on Europe's roads. More skeptical professionals in the industry — like VW's man in charge of sales, Werner P. Schmidt — know that "there won't be any further growth worth mentioning" in Europe.

Those who know the market estimate that annual growth will amount to between 1 and 2 percent at the most up to 1990 — over the next 10 years, in other words. The auto executives have reason for nostalgic daydreams: Between 1960 and 1980, output doubled in the West European auto industry, from a level of 5.5 million to more than 10 million vehicles.

Marketing Systems, the Essen auto forecasting institute, is prophesying another unpleasant trend for the Europeans: The industry's exports will be declining steadily — from the present level of 50 percent of total production to only 45.7 percent by 1990.

The Europeans' proud export percentage is being depressed by increasing Japanese sales and by the increasing presence in export markets of manufacturing operations performed abroad by European auto companies.

More than untimely in this situation is the worldwide onslaught by the Japanese, who have meanwhile become the world champion auto producers in terms of numbers.

Last year alone, more than 1.8 million Japanese cars rolled onto the U.S. market. The nimble Asians shipped an additional 1.3 million vehicles to Europe. The competitors from the Far East gained a 10.4-percent share of the FRG market — with 252,000 cars — thus moving ahead of the French and the Italians as the most successful importers.

The disastrous combination of growing Japanese competition, stagnating domestic markets and rising gasoline costs constitutes a threat to the established European automobile producers unlike any ever experienced by the industry. The change could mean the end for many a proud name in automobiles.

The forecasters at Renault, France's state-owned company, expect that there will be only six mass producers of cars left in the free world by the end of this century: including two Japanese — Toyota and Nissan; two American — General Motors and Ford; and two European — Volkswagen and Renault.

As the argument goes, only these six auto manufacturers possess the necessary financial resources, have balanced model programs and have rationalized their production operations to the point where they are already equipped for the battle over the markets of the future.

The managers of smaller automobile concerns — BMW chief Eberhard von Kuenheim, for instance — are not at all happy to hear such prognoses. Von Kuenheim has this comment: "One says that 5 will be left, while another guesses 8 or 10, but BMW will also still be around 20 years from now."

To safeguard his chances, von Kuenheim now has to do precisely what all the other major auto manufacturers are doing: He is investing record amounts in new plants, highly automated production processes and new, fuel-efficient models.

Outlays for these things appear just as sensible to von Kuenheim as they do to VW chief Toni Schmuecker and Ford boss Philip Caldwell. But does the investment craze make sense for the entire industry as well?

Hardly. If all the manufacturers do the same thing — as is happening right now — the competition will only become stiffer in stagnating markets. If everyone thinks he is on the right track with an expanded program and surplus production, then no one will have any advantage in the end. Survival will then be even more difficult for all.

One good thing about the billions now being thrown around in such anticipation of the future is that some of the investors will be forced out of the running all the sooner. So the investments will act to speed up the weeding-out process.

The auto executives maintain that they have no other choice. Since the Japanese appeared on the scene, no other word has gotten such a workout in the auto companies' executive high-rises as the word automation. But Europe's automobile plants can be further automated only if billions are spent to convert the old factories or to build completely new ones.

Operating alongside this is a second program costing billions. The extreme rise in the cost of gasoline has had such a lasting shock effect on Europe's drivers that they no longer value so highly their previously so popular middle-range cars -- like the Renault 20 or Audi 100, the Opel Rekord or Fiat 131. In some instances, sales for this type of car have dropped by 50 percent.

It is the upstanding family man, the better-positioned white collar employee or the well-paid worker who is suddenly having to acknowledge that his car has simply become too expensive. Such people used to move up to at least a somewhat bigger car every time they bought a new one. Now, one by one, they are dropping down to smaller cars and diesels.

More and more frequently, one sees drivers acting as rationally as the Hamburg shipowner who converted his entire motor pool to economy cars. He now has himself chauffered around in a diesel Rabbit.

The manufacturers are logically rushing to develop new car models that can run on less gas. And just as logically, the competition is becoming stiffer; additional surplus capacities are piling up.

Everyone is participating in the cutthroat competition. At BMW, for instance, Eberhard von Kuenheim is just now putting a new, small engine (1.5-liter piston displacement) in his Series-3 models. Moreover, he is considering building an even smaller car at a whole new plant.

Furthermore, the plant in Dingolfing is being expanded by means of an enormous investment -- from a daily capacity of 650 cars to 1,000 in the future. BMW is also building a new diesel engine plant in Austria and starting a rationalization program: The Munich firm plans to have about 300 robots operating by 1985.

All the expenditures are essentially quite correct: Increased capacity and automation can bring more business and greater profits; smaller cars belong to the future; and a diesel is necessary because it also makes big limousines economical.

The only problem is that the competition is doing the same thing. In Stuttgart, for example: Mercedes has had a diesel for a long time; and the Swabians will be bringing out their smaller car in 1982, when von Kuenheim finally comes out with his diesel.

Daimler-Benz is not sparing the cost on its small car: More than DM 1 billion is going into the new plant in Bremen, which is scheduled to produce close to 120,000

cars per year initially, with as many as 240,000 per year during the second phase of construction.

The Stuttgarters are simultaneously spending millions to modernize their plants in Sindelfingen and Untertuerkheim. In 1985, Mercedes plans to put together up to 560,000 cars in these new buildings and the remaining old ones. That would be twice as many as in 1970.

And Toni Schmuecker will not be willing to stand by and do nothing. It is true that he is not lacking in small cars, and he already has his diesel, but at the top of the line, where Mercedes starts, Schmuecker still considers himself weak. For that reason, the new Dasher has now been made longer, heavier and stronger — using the five-cylinder Audi engine.

This is also why the Santana is scheduled to appear in showrooms in the fall. The car is bigger than the Dasher and will presumably also be the first six-cylinder Volkswagen on the market. Once the Santana comes out, then the new Audi 100 must in turn be made larger and more up-to-date.

And the merry-go-round keeps turning: Ford and Opel have of course also initiated programs costing billions. After all, the U.S. offshoots of the international General Motors and Ford companies want to keep growing in Europe, at the expense of others if it has to be that way — and it probably does.

Ford first advanced into the small car class of the VW Polo, the Fiat 127 and the R 4 with its Fiesta. At that time the Cologne automakers built a brand new plant for the first mini-Ford in Saarlouis. The factory has recently been cleared to make way for the new Escort. Fiesta production was moved to Spain, where an even newer plant has been raised in the meantime.

The capacity of the Ford plant near Valencia — now at 260,000 Fiestas per year — is being expanded even further. In addition, another production facility for the Escort is to be built in Spain — all are new capacities for an already saturated market.

Ford's Fiesta is giving Opel no respite. Not exactly on good advice, the Ruesselsheim company had first sought to make inroads in the BMW and Mercedes class with its large models, the Senator and the Monza. Success was only temporary.

Opel's engineers are now working feverishly on a new mini. It will perhaps be rolling into the showrooms by late fall, adding to the competition among the small cars.

General Motors (GM), Opel's parent corporation, is not afraid of the crunch. GM is carrying on the most ambitious expansion program of all the Europeans: The new factory buildings being put up by General Motors are already giving the competition the shakes.

Just as though Europe were still an underdeveloped continent with a large and unsatisfied demand for motorized transportation, in June 1979 GM's management in Detroit decided on an aggressive strategy for the Old World.

At that time Elliot M. Estes, then head of GM and now retired, made known his displeasure that Ford was selling more cars than his own company outside the United

States, especially in Europe. "We're certainly not proud of that," said Estes. "We're after Ford, and we're going to catch Ford."

General Motors is consequently now building half a dozen new plants in Europe alone and is expanding existing facilities in the FRG and in Luxembourg, Belgium and England.

Construction of the new factories in Spain, France, Austria, Greece and Northern Ireland is costing nearly DM 5 billion. Those who know the industry predict that GM will be increasing its European production capacities not only by 300,000 vehicles annually, as was announced, but actually by 500,000.

It is more than uncertain whether there will be buyers for them, but GM's thinking is not so complicated as that — the company simply wants to shoot down its rival, Ford.

Also drilled in the expansion discipline are auto manufacturers in France and Italy as well as Ford in England. In France it is mainly Renault, while the second PSA group (Peugeot, Citroen, Talbot/Simca) is already having trouble keeping its accounts balanced. For 1980 alone, PSA has had to write off around DM 800 million in losses.

"What's going on at Renault is really something," says VW chief Schmuecker. Like Volkswagen, the French have converted their model program to a cost-effective system of assembling prefabricated parts. They plan to increase their production from a scant 2 million vehicles to 2.5 million by 1985.

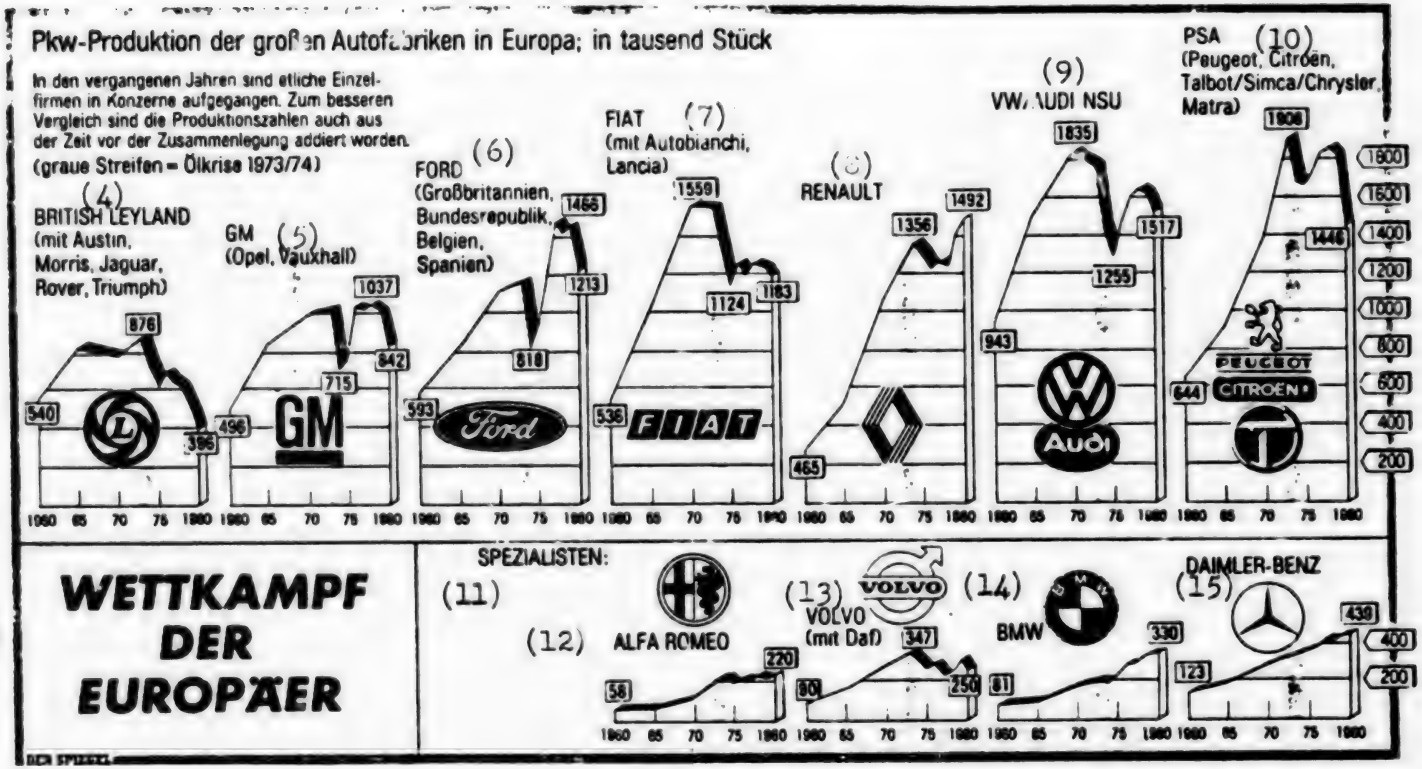
In addition, Renault chief Bernard Vernier-Palliez has signed on with American Motors, is cooperating with Volvo and has gotten into the truck business in a big way: Renault has purchased 20 percent of Mack Trucks (United States) and is now taking over truck production from PSA.

Italy's Fiat needs no new plants. Just a return to normalcy would be enough to increase the Italian automaker's production by about 300,000 units per year. Wage strikes, political work stoppages and chaotic disturbances have constantly disrupted production in recent years.

The situation has meanwhile grown more peaceful in Turin. And at least Fiat President Giovanni Agnelli is sure that his corporation is again being counted among the aggressors in the fight for Europe's drivers.

But at the moment he is more likely to have to go on the defensive — above all against the Japanese, who continue to be fully geared to the attack.

To be sure, the Far Eastern car manufacturers are cautiously in the process of changing their strategy. They know that they will not be able to do much more in Europe with exported cars alone, for that would only intensify the protectionism already being practiced extensively against Japanese cars. The Asians are consequently planning to increase their production and assembly operations in Europe.



Key:

1. Competition Among the Europeans
2. Passenger vehicle production by Europe's large auto plants; in thousands
3. A few private companies have merged with corporations in recent years. To provide a better comparison, production figures for the time prior to the mergers have been included. (heavy gray lines = oil crisis, 1973-74)
4. British Leyland (including Austin, Morris, Jaguar, Rover, Triumph)
5. GM (Opel, Vauxhall)
6. Ford (Great Britain, FRG, Belgium, Spain)
7. Fiat (Including Autobianchi, Lancia)
8. Renault
9. VW/Audi/NSU
10. PSA (Peugeot, Citroen, Talbot/Simca/Chrysler, Matra)
11. Specialists:
12. Alfa Romeo
13. Volvo (Including Daf)
14. BMW
15. Daimler-Benz

Leading the pack in this regard is Nissan (Datsun), the second-largest Japanese company. Nissan President Takashi Ishihara allied himself with Italy's Alfa Romeo, went in with Motor Iberica in Spain and is planning his own branch plant in England costing DM 1.4 billion.

At all three locations, Ishihara will see to it that in the end at least 200,000 cars are rolling out of the plants each year. This is the minimum volume for a highly automated production operation.

Japan's largest producer, Toyota, is still looking around in France and England for the best possible piece of land and for maximum subsidies — which the Japanese, just like their European competitors, collect as a matter of course as a reward for creating new jobs.

Honda has already allied itself with British Leyland. The Japanese and the British plan to join forces to design and produce an automobile.

The sons of Nippon in Europe will be constructing the most modern of the modern items offered by automobile company outfitters. And they will be settling in areas where wage costs are far lower than they are in places like Wolfsburg. Moreover, it might prove less expensive to fly individual parts from Japan across the high seas to Europe than to take the trouble to transport completed cars in special ships.

Then Japan's auto companies will be using the export cars they no longer market in Europe to press the Europeans even harder than before on the export markets in Asia, Africa and South America. In these more or less developed countries where the demand is chiefly for robust, simply constructed and low-cost cars, the Japanese are in a better position than their European competitors, with their relatively expensive and technically exacting models.

There is only one way for the Europeans to escape this pinch: They, too, will have to produce vehicles in faraway markets, cars that are adapted to the needs of the area. VW is trying this in Mexico and Brazil, for example.

But this will only worsen sales prospects for cars coming out of Europe. In extreme cases, the situation will be the same as with VW and Fiat: Volkswagen is now importing the VW Bug from Mexico, and Fiat is supplying the domestic market with mini-diesels from Brazil.

VW has come up with new capacities for the European market in recent years without building a single new plant — they were found in the domestic plants that used to produce for export.

The trend is even intensifying: VW is now building a second plant in the United States, for approximately another 200,000 cars per year. The cars built at the Emden factory — which used to produce exclusively for export to the United States — will then have to be sold in Europe.

And another serious situation is that not only is it becoming increasingly more difficult for many a European auto company to export to the United States, but the Americans themselves will soon be launching an export offensive aimed at Europe.

Although the U.S. auto industry is presently struggling through the most serious crisis in its history, the way in which it is carrying on the fight is worthy of note: By 1985, the industry will have invested around DM 160 billion in new cars and new manufacturing installations in its own country. The billions which all the Europeans together are planning to spend in the years ahead appear modest by comparison.

The Americans could jeopardize above all the manufacturers of products in the middle range — companies like Volkswagen and Renault, Fiat and PSA. For the first time in the history of automaking, General Motors and Ford will be building cars capable of challenging any European car — cars like the new Ford Escort, designed for small fuel-economy engines and highly automated production.

If the Americans achieve their goals, then even more pressure will be placed on the Europeans, with their production figures amounting to a maximum of 3 million cars per company. The Europeans will hardly be able to undercut the prices calculated for the U.S. companies with their enormous export volumes.

BMW chief von Kuenheim understandably sees things differently: "The giants of the industry are the ones having the greatest difficulty today," he says, "not a company like BMW." The man from BMW fancies every advantage for the "relatively small, non-bureaucratically managed" auto company in the future as well. He says it is these very firms that are more flexible and closer to the market. Furthermore, they could easily realize for themselves the advantages of large-scale production through cooperation agreements.

But VW chief Toni Schmuecker has greater respect for size: "When the Americans tackle something, they go right at it in a big way." And Mercedes executive Helmut Schmidt is pessimistic: "The Americans are the Japanese of tomorrow."

That can even be taken somewhat literally: Ford has an interest in one of Japan's largest manufacturers, Toyo Kogyo (Mazda), and is also planning to join forces with Toyota in the United States to build a plant for 300,000 cars per year. General Motors executives have also already put out feelers to Japan. GM has an interest in Isuzu, a still small manufacturer which is now expanding its plants with money from GM.

By the time the Americans and Japanese have established close production ties, even the European producers that still number among the really strong could go into a tailspin: Volkswagen and Renault.

The others, the ones who have already been hurt — like British Leyland, PSA and Fiat — would then disappear from the market as independent companies.

Only the automobile world's specialists in image and quality would perhaps remain untouched — provided that the top managements of companies like Rolls-Royce or Porsche, but also Mercedes and BMW, made no mistakes — in their models policies, for example.

BMW chief Eberhard von Kuenheim has to be especially careful. Though BMW has hitherto fared well under his direction, the Munich car makers are by no means as flush financially as a company like Mercedes.

The Munich firm also falls short when it comes to the scope of its program and the international sharing of risks. With nothing in hand but the advantage that a small company can operate much more flexibly in the marketplace, things will become increasingly tougher for von Kuenheim.

On the other hand, Mercedes chief Gerhard Prinz is basing more than 50 percent of his production on trucks and is working quite vigorously to make his corporation the leader in this segment of the international market.

Prinz has now established his company on the U.S. market as well, with his purchase of the Euclid company, a U.S. manufacturer of earth-moving machines and other extremely heavy vehicles used in mining and roadbuilding; he has also acquired Freightliner, a manufacturer of heavy trucks.

Prinz's competitors share his view that the future looks more profitable in North America and in the utility vehicle sector than it does in the hotly contested European passenger car trade. However, the others lack the millions and the know-how needed to do what he is doing.

As usual, Mercedes is in a better position than its competitors are — also in the private car business. While in recent months large numbers of wealthy clientele of Opel and Ford, BMW and Audi, have stopped buying their relatively expensive mid-range cars, Mercedes buyers have shown themselves to be virtually unconcerned.

The reason is that a Mercedes driver, whose car is financed by his company or his practice if need be, is a stranger to the financial pinch felt these days by the driver of a Granada when he puts his gas pedal to the floor.

To be sure, those who are making a switch are not at all unwelcome to the industry. Since the beginning of the year, since everyone realized that the price of gasoline is moving steadily toward DM 1.50 [per liter], there have been slightly happier faces at Volkswagen, Ford and Opel.

"We're experiencing a minor boom," says VW's head salesman Schmidt, happily. "We're even sold out for months ahead on the small diesel cars."

If the costly trend in oil and gasoline continues unbroken for a long period, it could at least make the industry the beneficiary of a new urge to purchase on the part of drivers who simply no longer want to buy the gas for their old gas guzzlers.

It is of course highly questionable whether this will be enough to keep in operation all the new assembly lines and automatic welding machines that are now being installed from Valencia to Wolfsburg. For in the long run, there is not much business to be had from drivers who want to save their money.

The car salesmen in the executive suites have suspected for some time that there is danger not only from the Japanese and the Americans, from increased gas prices and the oil shortages.

For, once the automobile loses its image as a prestige product, once it is purchased and treated like a cooking pot, the situation will really begin to get tight — as tight as it was after the first oil shock in 1973, when only 1.6 million cars were

sold in a 12-month period in the FRG, as opposed to the year before when a good 2 million were sold.

We have apparently gotten over that shock; it was followed by the biggest boom in the history of European automaking. Nonetheless, to the distress of the industry the creeping devaluation of the private automobile as an object of fun and prestige appears to be relentless.

Particularly depressing to the marketing experts has been the effortless march of the Japanese cars, their immediate acceptance as low-cost alternatives to the renowned European makes. The experts can no longer count on blind loyalty to makes of cars even at home.

It is for this reason that the billions now being invested so feverishly in the future of European cars are to some degree also a sign of uncertainty. None of the auto executives really knows what is going to happen. But no one wants to leave himself open to the charge by his board of directors in 5 or 8 years that he missed the boat in the early 1980's. After all, the money now being spent on all the new plants and equipment was accumulated during the last automobile boom. Now it has to be spent.

So now, with sums unparalleled in history, they are all mobilizing for the fight for survival — and possibly mobilizing each other right out of existence.

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COMMENTS ON JAPAN'S AUTOMOBILE INDUSTRY

Hamburg DER SPIEGEL in German 8 Jun 81 pp 48-59

[Article by Ford executive Robert Lutz: "With Our Backs to the Wall"]

[Text] Over the past 25 years, we have seen how the Japanese have been securing for themselves a position of worldwide supremacy in traditional Western branches of production: the usual things like the camera, timepiece, hi-fi, recreational electronics, calculator or motorcycle industries -- to name the most important ones.

In each of these instances, the increasing onslaught of Japanese imports has been the cause of serious inroads and has led to the virtual disappearance of the comparable branch of Western industry.

This resulted in a drastic decline for companies and employees in these economic sectors. Affluent Western economies blessed with growth were able to absorb the losses of these jobs initially, for employment figures in the affected industries were more likely to be in the thousands than the hundreds of thousands or millions. Moreover, manpower was in demand everywhere.

But all of a sudden we now have our backs to the wall and are fighting for the survival of the Western automobile industry.

If this view seems too extreme for anyone, I should like to substantiate it with a few facts:

In 1980, Japan became the world's largest automobile producer -- with production amounting to more than 11 million cars and trucks -- surpassing the traditional number one producer, the United States, by 3.1 million units, or by 40 percent. Markets such as the Far East or Africa are now almost exclusively in the hands of the Japanese. The same thing is happening to a growing number of European markets where there are no restrictions of any kind on imports from the Far East.

In Germany, the Japanese share of the private automobile market grew from 5.6 percent in 1979 to 10.4 percent in 1980. Despite a distinct drop in customer deliveries during the second half of 1980 in Great Britain, the Japanese achieved a level of about 12 percent, thus breaking their promise to limit their share of the market to 11 percent.

Their market shares have risen spectacularly in Holland, Belgium, Finland, Switzerland, Denmark, Norway and Austria — countries which have been granting the Japanese free access, unrestricted in terms of volume. Most of the European automobile producers are able to maintain their presence on these markets only by being willing to live with declining sales or with losses per unit sold, or both — because of the price situation which favors the Japanese.

Now that opportunities for export to Third World countries have virtually been eliminated, now that the "unprotected" European markets are being lost at an increasing rate, now that the Japanese are getting larger shares of the U.S. import market than the European manufacturers, and now that the attack on the German market — as one of Europe's most important historically and most interesting in terms of trade — has been prepared most carefully and has now begun, can the Western automobile industry survive for long?

Can this industry demonstrate endurance when most companies in this branch are showing either substantially reduced profits or even losses? Will the same thing happen to the automobile companies as happened to the manufacturers of cameras, watches and motorcycles? And should this be allowed to happen?

As I see the situation, the loss of the car and truck industry would be tantamount to a de-industrialization of the Western world. For it is not thousands, but hundreds of thousands and — if the subcontractor industry is included — millions of jobs that are at stake here.

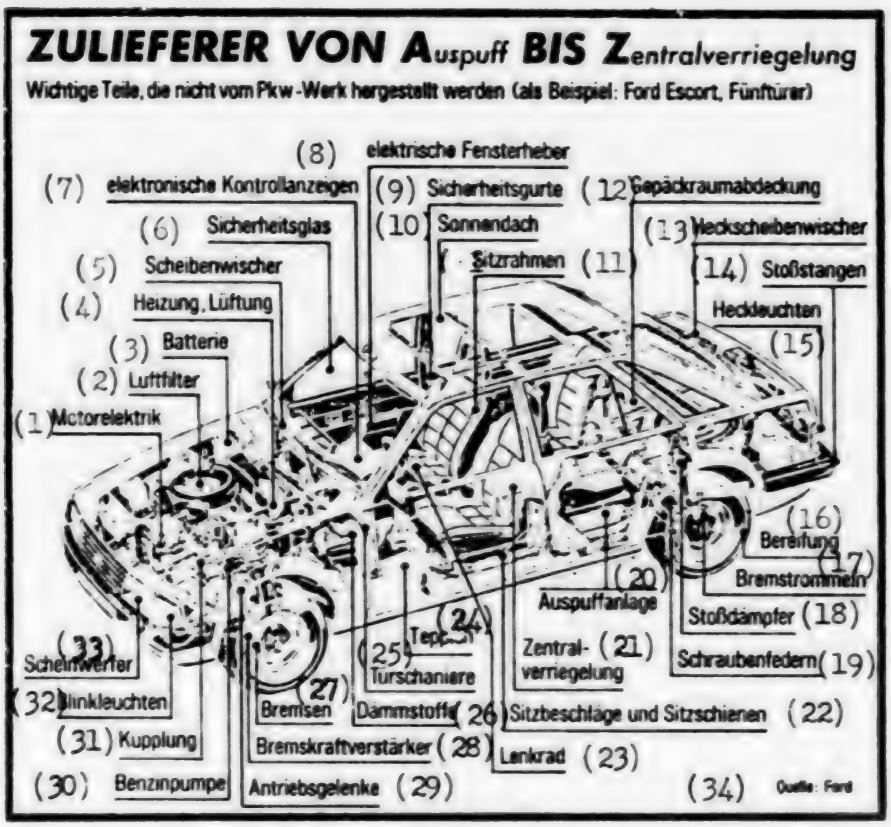
Indeed, the West would be losing not just the work that goes into the final assembly of every single imported Japanese car. The steel, glass, rubber, plastic and paint used in Japanese cars does not come from Europe or America. The cars do not use Michelin or Continental tires, Fichtel & Sachs shock absorbers, Champion spark plugs, Hella light bulbs or other products manufactured by thousands of large, medium-size and small companies that back up the automobile industry as suppliers of subcontractor products — in the Old World as well as the New.

Considering the large number of people directly or indirectly employed by the Western automobile industry — estimates range between 1 out of every 7 and 1 out of every 10 people employed — we cannot simply let this happen. New, high-technology industries like advanced electronics, for instance, can in no way offset the losses in this key Western industry — not even if we are better than the Japanese in these newly developing branches of industry.

The paradox here is that that which must not be allowed to happen is precisely what is happening. Given a Japanese cost advantage of $1,500 to $2,000 per car, including shipment to Europe or the United States, and considering some governments — with the United States and the FRG at the head of the list — which hold the view that the auto industry should solve its problems by itself, if you please, it is only a matter of time until this very situation comes to pass.

We must not be deceived by the trend this year, because rising prices and supply cutbacks will cause the Japanese market share to decline slightly. But this in no way solves the problem. The Japanese are simply aware of the potential reaction and have consequently become somewhat "more cautious" for the moment.

Fig. 1. Subcontractors from A to Z, from Exhaust to Central Locking System — Important parts not produced at the automobile plant (Example used: 5-door Ford Escort)



Key:

1. Electrical system
2. Air filter
3. Battery
4. Heating, ventilation
5. Windshield wipers
6. Safety glass
7. Electronic instrument panel
8. Electric window control
9. Safety belt
10. Sunroof
11. Seat frame
12. Trunk floor covering
13. Rear window wiper
14. Bumpers
15. Taillights
16. Tires
17. Brake drums
18. Shock absorbers
19. Springs
20. Exhaust system
21. Central locking system
22. Metal seat fittings and tracks
23. Steering wheel
24. Carpet
25. Door hinges
26. Insulation materials
27. Brakes
28. Disc brakes
29. Drive mechanism
30. Fuel pump
31. Clutch
32. Blinkers
33. Headlights
34. Source: Ford

We have to accept the fact that the Japanese conquest of the world's automobile markets can be attributed not to "dumping" but to the supply of competitive products. To be sure, until the end of the 1970's the Japanese had directly and indirectly practiced the most comprehensive and uncompromising protectionism for the benefit of their auto industry. And where were the advocates of free trade then, when we needed them?

The Japanese installed highly automated apparatus and installations. They built up efficient subcontractor industries, normally located in the immediate vicinity of the automobile companies. A pronounced sense of national solidarity, the willingness to subordinate personal demands to team interests and the community effort for the company and for Japan characterized the attitude of company managements and trade unions alike. In Japan, the dispute over who gets how much of the "pie" takes a back seat to the consideration of how the pie might be made bigger.

At the same time, during a long boom fueled by cheap oil, we in the West approved liberal increases in the size of staff departments, continuously more generous social programs, countless legislative regulations, wage and salary increases, health and safety legislation, longer vacations and shorter working hours — all of which are certainly desirable things to have, but which also drive up costs and reduce productivity. They do indeed improve the quality of life, but definitely not the balance of payments.

Before I am accused of the usual capitalist exercise of shifting all the blame onto the work force and the unions, I should like to make it clear that Western management has also contributed its share to this whole set of problems. During the comparatively "easy" years, we in management were too cautious, too systematic and excessively analytical.

But why should we take risks of any kind in times of problem-free expansion? Why should we introduce totally new and revolutionary products and production processes — which, moreover, pay off only in the long run, and then with a question mark — if a less revolutionary product with fewer changes engenders lower costs and, to boot, produces an even greater short-term return?

Since we need so many analyses in our steadily growing companies, why should we not permit ourselves the luxury of extravagant staff departments? And finally, why should we push automation of the plants when it costs so much money and when, moreover, this troublesome subject meets with such precious little approval from the unions because of the possible elimination of jobs?

Regardless of whether the error lies with labor, the unions, governments or management — or with all of them — the fact is that the Japanese auto industry is producing between 40 and 50 vehicles per employee per year — compared to between 12 and 15 per employee per year for those European manufacturers with particularly efficient operations.

It is true that the Japanese purchase more on the outside and that their companies tend to be assembly plants rather than complete, heavily structured manufacturers. But this amounts to a maximum of 5 to 10 cars when "vehicles per employee per year" are figured.

We are going to have to increase our work effort and our productivity drastically. This applies equally to management and labor.

In 1980, Ford produced a scant 1.5 million cars and trucks in Europe — with a work force of around 140,000. Toyo Kogyo, the manufacturer of Mazda vehicles, built 1.1 million cars with 22,000 employees in 1980. Hard to believe, but true.

It must be remembered in this regard that Ford is one of the most efficient and p roductive manufacturers in Europe. The conclusion is obvious: In the future, management and the work force cannot get around operating with fewer personnel while still expanding production.

This touches upon the next essential step: the necessity of investing on a massive scale in new manufacturing technologies and new products that will dispel our conservative notions of the past. These parallel efforts to introduce new products and new manufacturing installations will tax the automobile industry's financial reserves to their utmost limits. This complete retooling for the manufacturer of totally new products in brand new plants also accounts for the $80 billion now having to be spent in the United States.

Moreover, the European and American automakers must learn to swallow their often considerable pride and work together constructively so that joint investments may be made and costs reduced. Collective use of the same four- and six-cylinder engines by Volvo, Renault and Peugeot is an excellent example of this kind of cooperation.

This trend will continue and intensify. In addition, the European producers should basically be prepared to join with Japanese companies in order to assure their economic survival either as whole companies or at least as import companies. This will be especially true if the Western governments decide to sacrifice their auto industries on the altar of the pure free-trade doctrine.

None of the aforementioned measures — neither the new models, the new plants nor the reduced work forces — will be enough to close the productivity gap adequately. For the main problem affecting us is ultimately one of social policy, thus involving factors that clearly lie outside the sphere of control of the automobile industry.

We in the West have an innate appreciation of individualism and individual accomplishments. One of the reasons for this lies with our agricultural heritage, wherein every farmer worked his own land and raised his own sheep or cattle. The situation was not the same in Japan: For hundreds of years the growing of rice required a communal effort, with every member of the community taking turns working in every other member's paddies.

When this ancient institution is combined with Japan's lack of natural resources and arable land, as well as its own view of itself as an insular kingdom, the result is a society with the collective conviction that its strength lies exclusively in subordinating the individual to the needs and desires of the community.

This is not exactly a Western concept. Nevertheless, it is reminiscent in a certain way of Marxist thought — with the fine distinction that Japan, as a collective society, does not exhibit the frictions and inefficiencies of Marxist-oriented economies, and that its system of allocating economic productive forces and financial

means -- investments, profits, penalties and rewards -- is effectively capitalistic through and through.

We are thus faced with a society that combines with the efficiency of capitalism socialism's sought-after but never attained spirit of "all for one, and one for all."

The European governments have blessed the industry with strong, independent trade unions, increasingly shorter work weeks and an abundance of laws favorable to labor -- including the one that requires the continued payment of sick pay without verification of illness. All of these things are wonderful if a society can afford them.

But how is our present system of society -- one characterized by a 39-hour work week, a 10-minute break every hour, longer and longer vacations, absentee rates between 10 and 25 percent in most of the Western countries and union opposition to job cuts resulting from automation -- how is this form of society supposed to prevail against another form in which employees advertise a "strike" by wearing "protest" armbands while they work, in which they willingly work overtime, in which the trade unions regard their primary aim to be that of "keeping their company healthy," in which workers and management use vacation days to complete an especially important job, in which only some of the employees belong to the permanent work force ("a job for life"), and one in which many small subcontractors use low-paid housewives as a principal labor factor without accruing additional personnel costs.

The answer is clear: Left to its own devices, the Western auto industry cannot compensate for the discrepancies between Western culture and the resolute sense of joint responsibility found in the Japanese social system.

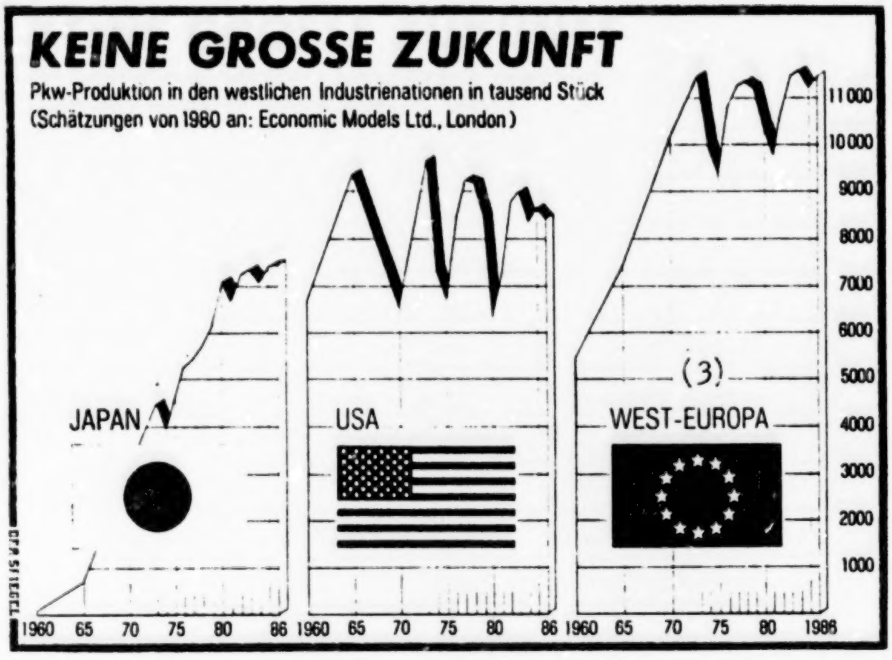
Nothing in life is perfect -- not even Japanese society, let alone Japanese vehicles. Cars and motorcycles from Japan are subject to a rapid and increasingly faster succession of cosmetic changes as well as a bewildering array of models, body designs and names.

The almost constant model changes -- together with the many different models themselves -- are a source of insecurity for the consumer, for this situation complicates customer service and spare-parts supply. It prevents the development of a clear product image, which in turn results in a lower resale value.

Moreover, there are growing indications that we need not exactly hide in shame in the face of Japanese quality -- especially when it comes to durability. We have only to see to it that our little individualistic Western assembly foul-ups are kept out of our vehicles and that we are able to maintain our technical lead in the area of dynamic handling characteristics -- though it would be a mistake to consider the latter a sure thing.

There are also indications that Japanese society is gradually "becoming Westernized." For example, older supervisors are seeing a decline in the way their younger subordinates view their work as well as in their enthusiasm for the work. The Japanese establishment is shocked when it hears about schoolboys who beat up their teachers because of dissatisfaction with a conformist, achievement-oriented social system -- as happened only recently. And it has also been observed that the Japanese seem to be trying to get more leisure time to show off their designer jeans and their Gucci belts and purses. At most, however, this is just the beginning of a long evolutionary process.

Fig. 2. Future Not Good



Key:

1. Automobile production in the Western industrial nations — in thousands
2. Estimates beginning in 1980 provided by Economic Models Ltd, London
3. Western Europe

In any event, the transition from a monolithic, disciplined social system to a pluralistic and individualistic society along the lines of Western society will never be made in time to save the West's industry — if the transition ever becomes complete at all.

Whether we call it protectionism, fair marketing, restrained marketing, self-imposed restrictions or anything else — we must nevertheless take steps to prevent our Western domestic markets from being flooded with Japanese cars. Would that signify the end of free trade — as we know it — not to mention a disaster for the West, especially for the Federal Republic of Germany?

I categorically refuse to believe that.

Many industries throughout the world are protected in the most varied ways for reasons of national interest. I can think of agriculture, for example, or the 50-cubic-centimeter "Mofas" and "Mokicks," or other small motorized two-wheelers that are profiting from national legislation designed to keep them alive. I would bet anything that an accurate analysis of EC or U.S. trade would turn up hundreds of industries that are protected in some form or another because they are considered "worthy of survival," for economic reasons or for reasons of emotion or tradition.

If we make it clear to the Japanese that we are not willing to see our industry destroyed, it will not unleash the often feared "trade war," for the Japanese have been waiting for these very instructions. After all, they too have to plan their activities. If they do not receive these instructions, they will continue on with their expansion. The FRG's dependence on exports, often cited in this context, has nothing to do with the case.

A large share of the FRG's industrial exports goes to other EC countries or to the United States, and consequently can scarcely be affected by EC or Euro-American trade restrictions on Japanese automobile products. As traditional trading nations, Italy, Spain and France have indeed done rather well for themselves even though they allow only a few Japanese car and truck imports — or none at all.

The governments of the Western world must now decide whether what they want in the future is a fully functioning automobile industry or merely an import and assembly industry.

And before they decide to sacrifice the auto industry altogether, they should weigh carefully whether there are other "growth industries" that can absorb all those millions of jobs that would result if the Western automobile industry were to go under.

I can only hope that they will find such industries. Moreover, I would love to know which ones they might be. It is a dead certainty that we can keep neither the United States nor Europe alive with designer jeans, McDonald's hamburgers or pop groups.

And the unions, too, must finally decide whether they want higher and higher wages, shorter and shorter work weeks and numerous other amenities, or whether they wish to preserve one job or another in a viable automobile industry. For we can unfortunately no longer afford both at the same time in the Western world.

In the future we shall be able to afford neither the high cost of the disputes about who is to get which piece of the pie — in other words, the constant testing of strength between labor and management, between government and business — nor the cost of shorter work weeks and dubious sick leave, nor the cost of our egotistical, flagging affluent society — a society that still works more efficiently than socialism, but definitely not more efficiently than Japan's.

The fact is that we will not be able to afford all the benefits and costs of our social system if we simultaneously import and sell goods produced by a society that is much more industrious and less self-seeking. This will work only for a short time.

In the medium term we shall be transferring to Japan our jobs in industry, our purchasing power, our industrial base and our entire prosperity.

The choice lies with those Western governments that have still not seen the handwriting on the wall.

Would these governments please inform the automobile manufacturers of their decisions as soon as possible? Because we have to make some decisions about where in the world we are going to be building our cars in the future.

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